

Intel® Enterprise Platforms

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Mike Fister

**Senior Vice President and General Manager
Enterprise Platforms Group**

Today's News

- **2003 Momentum: Record Year for Intel® Xeon™ and Itanium® processor families**
 - Intel Architecture exceeding RISC: in performance, systems revenue & world's top supercomputers
- **2004 Announcements: New Products, Systems, and Software**
 - Intel highlights leadership enterprise technology roadmap
 - Software advancement roll out: IA-32 execution layer and new performance compilers enter production
- **Future Vision**
 - Future Itanium processors deliver >2x Moore's Law performance and lower cost platforms
 - Low power Itanium processors
 - New technologies



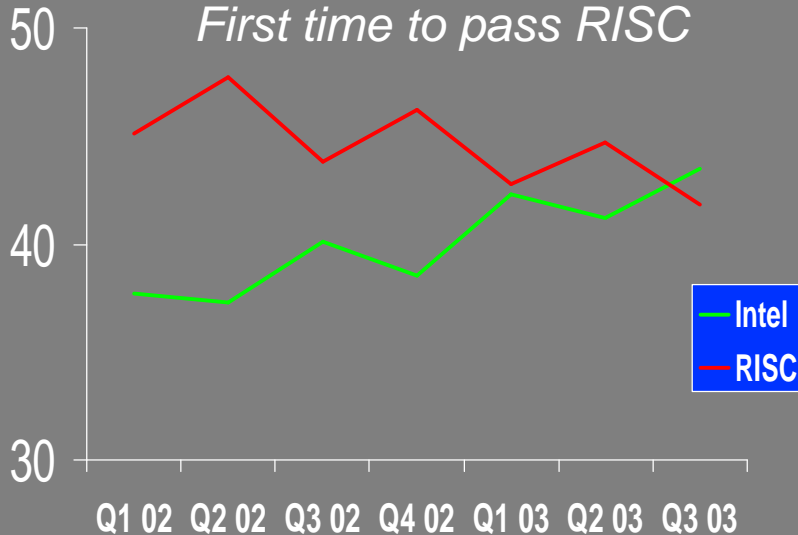
MP



2003: Milestone Year for Intel in Enterprise

RISC and IA Server System Revenue MSS*

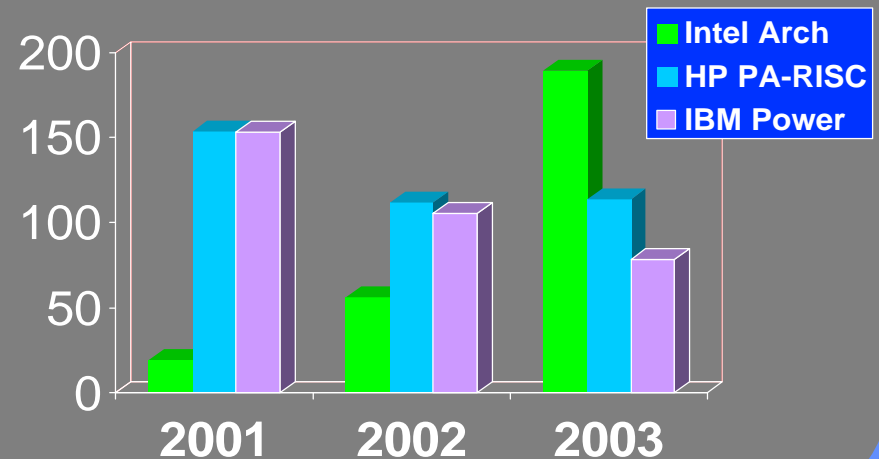
First time to pass RISC



* IDC Server Tracker Q3 '03

Systems in HPC Top500 by Architecture^

First time to pass top RISC arch



^ Source; www.top500.org. November lists from each year

- Record shipments: Xeon™ & Itanium® processors
- Record performance: Surpassing RISC on #1 TPC
- Significant RISC to IA migration – enterprise and HPC

2003: Itanium® Processor Success

Enterprise-hardened platforms

- RAS, data integrity on CPU
- New systems with RAS, partitioning, scalability, manageability



Breakthrough performance, industry-leading TCO

- EPIC architecture delivers 36 #1 rankings across 8 benchmarks**
 - TPC-C, TPC-H, SAP 2-tier SD, Linpack HPC, Specfp2000_rate, Specint2000_rate, Specjbb2000, Specweb99_SSL

Choice: Breadth of solutions

- Microsoft* Windows* in production
 - OS flexibility: Windows*, Linux*, Unix*
- Greater than 1000 production applications and tools: 3X 2002
- >50 2-64p platforms: 2X 2002

Strong long-term roadmap from Intel, industry

- Headroom: 6 CPU's in development
- 7X more performance in 3+ years

Delivering what the End-user Wants:
Enterprise-hardened platform with higher performance, lower cost across more OEMs, OS's, and databases

** Combination of multiple CPU results (1P, 2P, 4P, etc) across 8 benchmarks. As of 12/31/03.

*Other names and brands may be claimed as the property of others.

**Data is current as of 12/31/03. Previously published TPC results. Data obtained from publicly available information and is subject to change without notice. Contact the manufacturer for the most recent information. TPC-C, tpcc, \$/tpmc, TPC-H, QphH, \$/QphH, TPC-W, WIPS, and \$/WIPS are trademarks of the Transaction Processing Performance Council. For more information, see: www.tpc.org. Other Sources: www.sap.com/technology, www.spec.org, www.netlib.org (See notes for full description).

Itanium® 2 Processor End-Users

ING Comercial America

Financial

Retail

Retail

Proctor & Gamble

CompUSA

Financial

CitiStreet

A Citigroup and State Street Co

Retail

Barnes & Noble

Retail

Metro AG

Financial

First Trust

Retail

Fuji Film

Automobile

BMW

Automobile

Fiat

CBS
Broadcasting, Inc

Energy

Total Oil

Sabre
Holdings, Inc

Healthcare

Merck

BP

Energy

Communications

Korea Telecom

Healthcare

Eckerd Corp

Energy

PetroChina

Communications

Telecom Italia

Govt / Education

NASA

Healthcare

Fortis Health

Govt / Education

CDC / LLNL

Replacing RISC....

In the Largest Corporations

Across Vertical Markets

Across application segments

In every geography

*Other names and brands may be claimed as the property of others.

intel®

1H 2004 Announcements

- IA-32 Execution Layer for Itanium® entering production
- Intel® Xeon™ Processor MP moving to 4M in Q1
- Enhanced Intel® Xeon™ Processor DP in Q1
- New IBM* 4P blade; Intel blade (“McCarran”) in Q1
- HP* MX2* dual Itanium® processor module
- Expansion of Itanium® product line (IDF)
- Nocona processor platforms (Lindenhurst/Tumwater chip sets) on track for Q2 introduction
 - Faster FSB, PCI-Express, DDR2, Dual Gigabit Ethernet

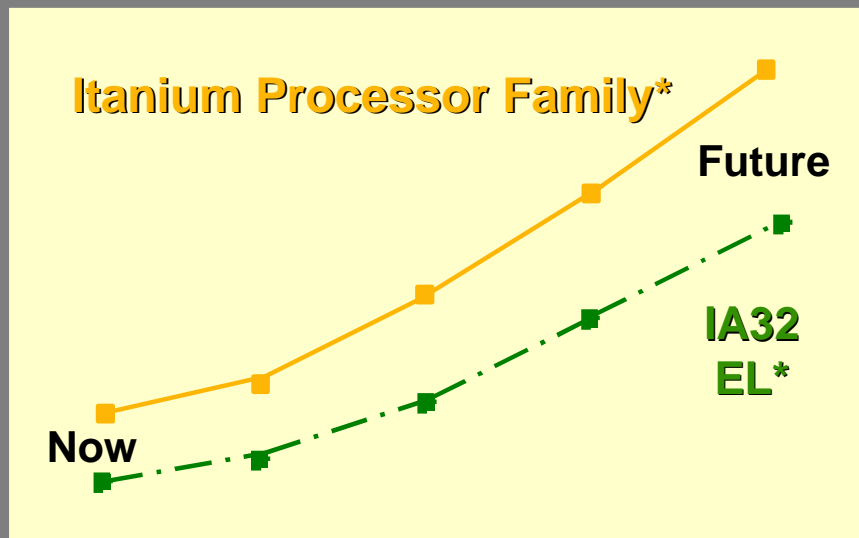


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Software Technologies

- Now: IA-32 Execution Layer (IA-32 EL) entering production for Microsoft* Windows*

IA-32 EL Performance scales with future Itanium® processors



- Performance ~ 1.5GHz Xeon™ processor MP today
- Will deliver ~ 50% to 70% of native Itanium® architecture performance
- Processor enhancements & frequency further enhance IA-32 performance

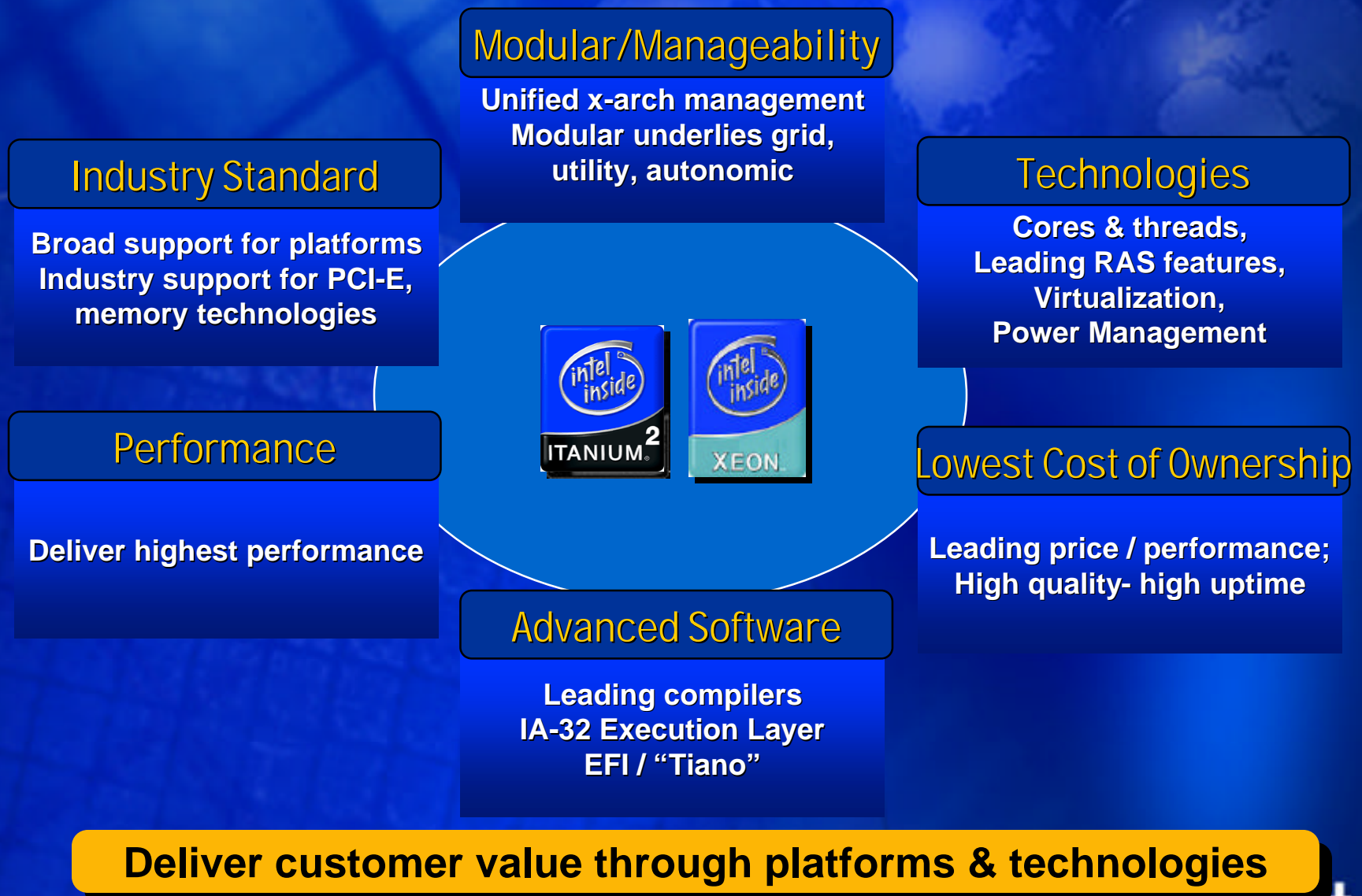
- Intel® Enterprise Compilers v8.0 now available

Data extrapolated from measurements using frequency scaling and assuming incremental optimization.

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All products, dates, and figures are preliminary and are subject to change without notice.

Enterprise Vision: 2004 and Beyond



Intel® Xeon™ Processor Family Innovations



2003 & Prior Enhancements

- Hyper-Threading Technology
- Intel® Netburst™ micro-architecture
- SSE & SSE2 instructions



2005 & Beyond Enhancements

- Virtualization
- Rack-based power management enhancements
- Dual core CPUs (MP)

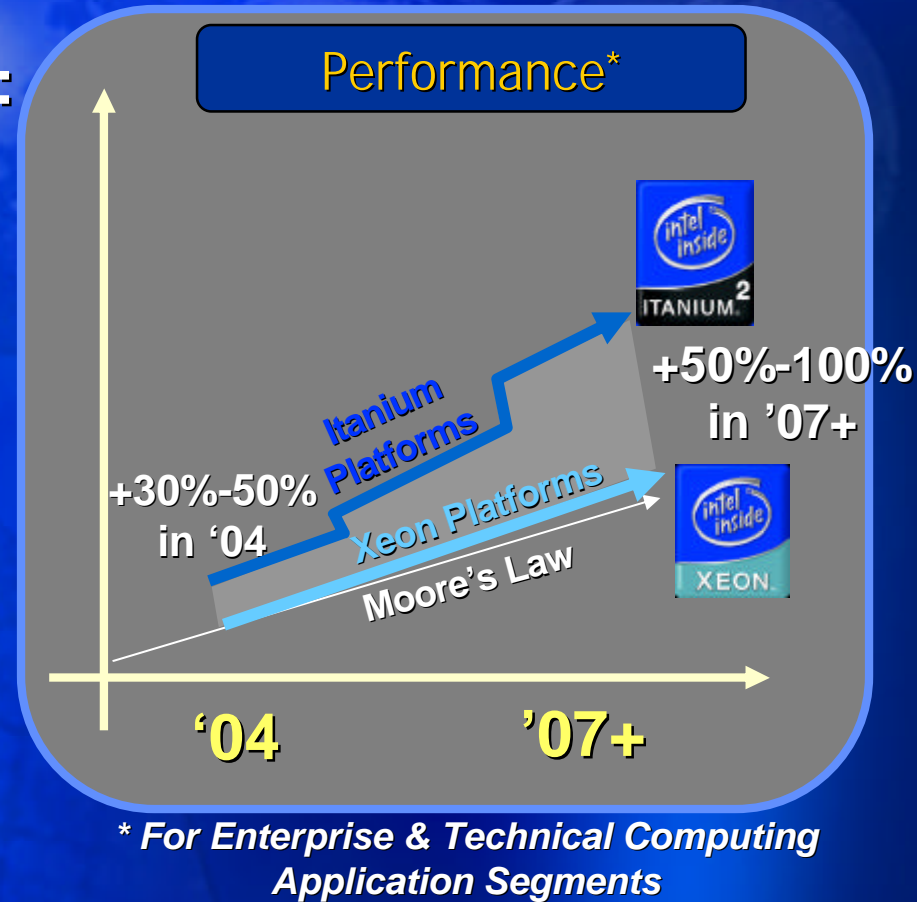
2004 Enhancements

- New PNI Instructions
- 800MHz FSB
- PCI Express*
- Power Management Technology

Intel Focus on Platform Innovations that Deliver Value to all Enterprise Segments

Itanium® Architecture: Optimized for Multi-Core

- **Parallel execution leadership:** only Intel has all 3:
 - Multi cores on same die
 - Multi threads on same core
 - Explicit Parallelism in each core
- **EPIC*: inherent advantages for multi-core, multi-thread**
 - Architecture: Parallelism + many registers to keep data on-chip
 - Core size: Smaller than IA-32, up to 2X more cores per die on Tukwila (than on IA-32)



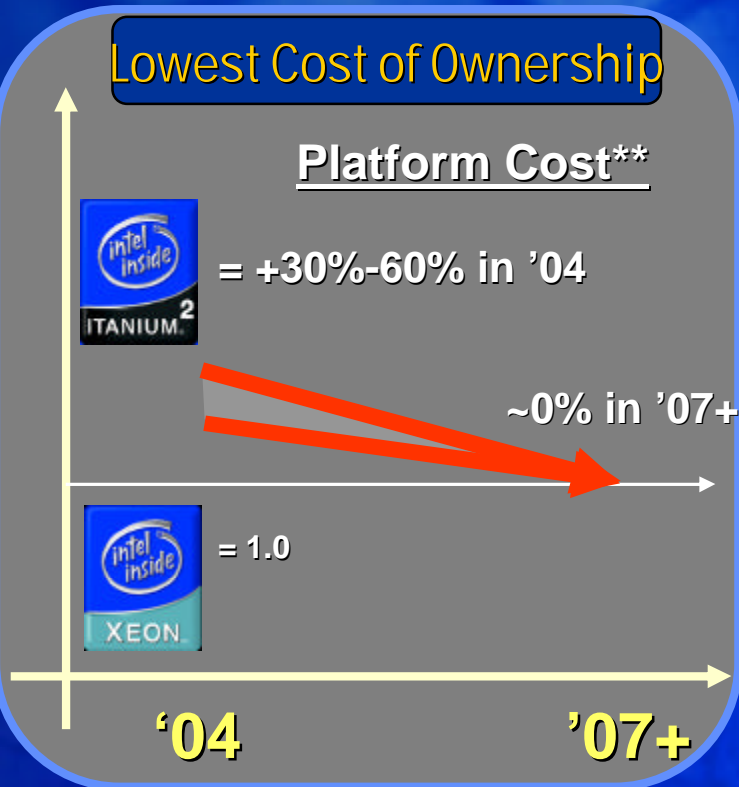
Itanium® Processor family delivers >2X Moores' Law performance

* EPIC is Itanium's architecture "Explicitly Parallel Instruction Set Computing"

Announcing New Itanium® Platform Cost

Lowest Cost of Ownership

Platform Cost**



**Data based on Intel projections*

***'04 Price based on comparable OEM systems*

- Today: Itanium exceeds RISC performance & price / performance
- Today: Itanium platform delivering superior price / performance vs Xeon™ on transaction processing
 - 30% more transactions at 10% incremental cost of platform/ OS / DB**
- Enabling technologies to achieve Itanium® platform cost parity with Xeon™ platforms
 - Common platform components to lead to common platform infrastructure over time

Itanium® platform up to 2X Xeon™ platform in:

- Enterprise & technical application performance
- Number of cores / die
- Price/ performance

** 30%-60% or higher. Based on web pricing: 4P Xeon processor MP & Itanium platforms (24GB RAM) from Ion Computer; 2P platform (4GB RAM) from Dell

Intel Confidential

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Technologies Enhance All Platforms

Cores & Threads

Support for increased number of threads over time

Virtualization

Processor and platform level features

RAS

Comprehensive data integrity & recovery from errors

I/O and Memory

Additional performance and RAS support



Management

Common management standards
Power management

Technologies

Hyper-Threading Technology

2003

Processor power states control consumption

PCI-Express
DDR2

2004

Cache recovery

Two physical processor cores

User defined power thresholds

2005

Multiple physical processor cores

Data center power management and control

Enhanced I/O

Next Generation

Going Beyond GHz with Strong Technology Roadmap

Enterprise Platform Initiatives

Modular/Manageability

Industry Standard

● Manageability

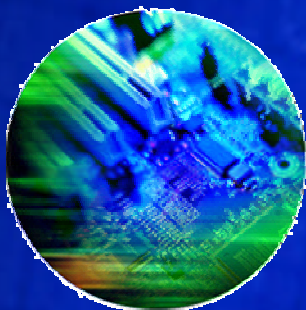
- DMTF: New Server Management Working Group
- Intel: Cross-platform Manageability Architecture Task Force
- IPMI 2.0 specification to be released Q1
- End-to-end infrastructure management demo at Spring IDF



● PCI Express momentum accelerating

- Strong OEM trend to PCI Express slots
- Significant IHV development of PCI Express-based adapters: Multiple state-of-the-art adapter cards in every application category in 2004
- Growing IT affinity: PCI Express IT Network '03 launch

Intel continues to drive platform level innovations



Enterprise Modular Computing

- 4P Intel® Xeon™ processor MP server blade Q1 2004
- Intel-based GbE HBA and switch Q1 2004
- Infiniband* and Brocade* FC switch available mid'04
- Itanium® architecture blades by '05
- Foundation architecture for Utility Computing, Grids, Autonomic computing, etc



Intel providing building blocks for enterprise computing

Summary

- **2003 most successful year for Intel enterprise business: crossover RISC in revenue and HPC**
- **Intel enterprise vision: Deliver leadership platforms and technologies**
 - Dual/multi cores, virtualization, power management, PCI Express
- **Future Itanium® processors deliver >2x Moore's Law performance and lower cost platforms**
- **Success in enterprise initiatives**
 - Manageability: Server Management Working Group
 - PCI Express IT network
 - Software: IA-32 Execution Layer and compilers

BACKUP

Intel® Itanium® Processor Family Roadmap

Performance

Lowest Cost of Ownership

Multi-Processor (MP) Capable *Leading Performance*

Itanium® 2
Processor

*1.5GHz, 6M; 1.4GHz,
4M; 1.3GHz, 3M*

Itanium® 2
Processor

*(Madison 9M)
>1.5GHz, 9M*

Montecito

*Dual Core, 24MB,
90nm Technology*

Tukwila

*Multi Core,
Developed with
ex-Alpha team*

Dual Processor (DP) Capable *Leading \$/FLOP*

Itanium® 2
Processor

1.4GHz, 1.5M, DP

Itanium® 2
Processor

>1.4GHz, DP

Future
DP

Future
DP

Dual Processor (DP) Capable *Lower Power*

LV Itanium® 2⁺
Processor

1.0GHz, 1.5M, DP

LV Itanium® 2
Processor

>1.0GHz, DP

Future
DP, Low Voltage

Future
DP, Low Voltage

2003

2004

2005

Next Generation

Long term Itanium® Roadmap Strength

Intel® Xeon™ Processor Family

Performance

Lowest Cost of Ownership

Multi-Processor (MP) Capable

Intel® Xeon™ Processor MP (4MB L3 Cache)	Potomac <i>Intel® Twin Castle 4S Enabled chipsets</i> Incr. L3 Cache	Tulsa <i>Intel® Twin Castle 4S Enabled chipsets</i> Dual Core	Future
Existing Platforms	New Platforms		

Dual Processor (DP) Capable

Intel® Xeon™ Processor (3.20 GHz, ≥1M)	Nocona (>3.2 GHz, 1M) /Jayhawk	'Jayhawk' / Future	Future
Existing 533 MHz	'Lindenhurst' 'Tumwater' 800 MHz Platforms		New Platforms

2004

2005

Next Generation

Increased Value, Roadmap Acceleration

